

## Notes

### A Recessive Lethal "Wingless" Mutation in *Tatochila* (Pieridae)

Bowden (1963, *Entomologist* 96:52) reported the occurrence of an apparently recessive lethal mutation in *Pieris napi* L., producing wingless and legless pupae. A somewhat similar but doubtfully homologous mutation affecting the pupal wings has occurred twice in the laboratory culture of the Andean-Patagonian *Tatochila sterodice* Stgr. species-group, maintained at Davis for four years. It was first noted in a line of pure Chilean *T. mercedis* Esch. derived from pooled ova of several females from **Vicuña**, Coquimbo in 1979. This stock was overall rather unhealthy, and the "wingless" pupae which appeared in several families of the second generation were attributed to pathology and discarded (although no similar pupae had been seen in previous Pierid cultures). The unhealthy subcultures were terminated, and no further "wingless" pupae were seen until 1983. In November 1982, a new line of pure *mercedis* was established, from pooled ova of several females collected in metropolitan Santiago. By this time no Chilean *mercedis* genes were in the culture, but *mercedis* from the Province of Neuquén, Argentina, had been incorporated in several hybrid subcultures with no "wingless" pupae having appeared. The first lab generation of Santiago *mercedis* was completely healthy, but a very few "wingless" pupae were noted in the second, derived from the pooled progeny of three sib matings. In the third, 6/33 pupae reared under continuous light and continuous high temperature (24L, 27°C) were "wingless," but this was again a pooled lot from two sib matings. Further breeding was confined to families which had shown no "wingless" pupae.

A first-generation male *mercedis* of the new Santiago line was mated to a female of complex hybrid ancestry involving Argentine *mercedis*, *sterodice*, *vanvolxemii* Capr., and Ecuadorian *arctodice* Stgr. The resulting brood was vigorous and contained no "wingless" pupae. Seven sib matings were obtained within this brood. In the first, Sib A, "wingless" pupae occurred under both rearing regimes used (24L, 27°C: 15/48; 10L14D, 23.9°/12.8°C: 6/42) (total 21/90). No other "wingless" pupae were observed in the other sib matings, including the very large (over 250) Sib C, except one in the small Sib F (which could conceivably represent an accidental egg- or larval transfer from Sib A). All the sib broods were reared side-by-side under the same conditions in the same growth chambers on food from a common source, and were handled only by the author using standardized, uniform procedures. Only a few subcultures from this overall brood of over 1000 animals were made, and families containing "wingless" pupae were again not bred.

Larvae which give rise to "wingless" pupae are apparently normal. Unlike Bowden's trait, the legs are not directly affected, nor are the wings truly missing. Instead, the wing-cases are wholly missing, so the wing sacs are everted and convoluted. The lack of the wing-cases apparently causes more or less deformity of the proboscis- and leg-cases for purely mechanical reasons. Typical examples are shown in Fig. 1. None of the ventral thoracic structures is fully or properly hardened, but the head and thoracic dorsum are normal or nearly so. Most of the "wingless" pupae die within 4 days, but a few have progressed to the pharate adult but failed to emerge. In these pigment was not laid down in the wings but was normal elsewhere.



Fig. 1. Three "wingless" pupae from brood Sib A showing variable degree of deformity on the ventral surface. Note partially everted wing sacs. Two of these pupae reached pharate adult status before dying. (Photograph by S. W. Woo.)

No attempt was made to do the formal genetics of this trait. However, the above data are all consistent with the interpretation of "wingless" as a Mendelian recessive lethal. The source of the second allele in the sibs derived from the complex hybrids mated to pure *mercedis* is uncertain, but it is suggestive that the trait has only appeared in crosses deriving from *mercedis* and has never been seen, for example, in pure *vanvolxemii* although over 1,000 have been reared. Although nutritional problems can cause somewhat similar deformities in Pierids reared on artificial diets, the uniform food sources and rearing conditions argue against such causation in our pupae. Wing deformity is a common and non-specific indicator of infection by bacteria or viruses. Again, the rearing conditions argue against infection, but the possibility—especially of latent or transovarial infection—cannot be excluded. An anonymous reviewer of this paper reports (*in litt.*) the occurrence of a similar condition in a mass culture of *Pieris brassicae* L.: "The wing cases were totally absent and the leg- and antenna-cases strongly reduced." The condition, whose causation was apparently not demonstrated, was confined to two sub-cultures and was eliminated when they were terminated in the third generation.

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